WHAT IS CLAIMED IS:

1. A washing machine comprising a washing spin-drying drum pivotted freely around a rotation axis in the outside tank, a body of revolution pivotted freely around a rotation axis whose center is the same as one of said rotation axis at the bottom of said washing spin-drying drum, a change-over mechanism for connecting or releasing the rotation axis of said washing spin-drying drum to the rotation axis of the body of revolution, and an electric motor, whereby washing or rinsing operation is carried out by rotating forward or reversely the body of revolution to stir the inside of said washing spin-drying drum, and then spin-drying operation is performed, wherein

said electric motor comprises;

a stator having a primary winding and a rotor having a field magnet, said field magnet comprising a first field magnet having different polarity magnetic poles sequentially arranged in a rotating direction and a second field magnet having different polarity magnetic poles sequentially arranged in a rotating direction, said first and said second field magnets being opposite to magnetic poles of said stator; and

a mechanism for changing a phase of a composite magnetic pole of said first and said second field magnets with respect to the magnetic pole of said first field magnet depending on a direction of torque, said mechanism for changing depending

on a direction of torque comprising means for making magnetic pole centers of equal-polarity of said first and said second field magnets in phase by a direction of torque generated in said rotor and by balance of magnetic action forces between said first and said second field magnets; and means for making the magnetic pole centers of said first and said second field magnets out of phase when the direction of torque generated in the rotor is reversed.

2. A washing machine according to claim 1, wherein

said electric motor comprises a means for making said first and said second field magnets in phase at an initial position; and a means for making the magnetic pole centers of said first and said second field magnets out of phase with each other, and

said mechanism for changing the magnetic pole centers depending on change in the direction of torque is constructed so that said first field magnet may be fixed to a shaft, and said second field magnet may be separated from said shaft, and the magnetic pole center of said first field magnet and the magnetic pole center of said second field magnet may be made to be out of phase by forming said shaft and said second field magnet relatively movable from each other within an angle corresponding one pole of the magnetic pole.

3. A washing machine according to claim 1 or 2, which uses an electric motor comprising:

said mechanism for changing the magnetic pole centers depending on change in the direction of torque, said mechanism being constructed so that said first field magnet may be fixed to a shaft, and said second field magnet may be separated from said shaft, and said shaft and said second field magnet have screw functions to be connected to each other by forming a bolt screw portion in said shaft and a nut portion inside said second field magnet;

a stopper at a position apart from a side surface of said second field magnet; and

a servomechanism capable of moving said stopper in parallel to said shaft according to a rotating speed of said motor.

4. An electric motor according to any one of claim 1 to claim 3, wherein a lead angle of current supply by a controller for controlling said controller is corrected according to a positional shift of a composite magnetic pole of said first field magnet and said second field magnet.

5. An electric motor according to any one of claim 1 to claim 3, wherein said first field magnet is fixed to a shaft, said second field magnet is separated from said shaft, said shaft

and said second field magnet have screw functions to be connected to each other by forming a bolt screw portion in said shaft and a nut portion inside said second field magnet, a displacement in an axial direction of said second field magnet is detected, and a lead angle of current supply by a controller for controlling said inverter is corrected corresponding to a positional shift angle of a composite magnetic pole of said first field magnet and said second field magnet.

6. An electric motor according to any one of claim 1 to claim 3, wherein said first field magnet is fixed to a shaft, said second field magnet is separated from said shaft, and a plurality of supporting mechanisms capable of guiding rotational motion and reciprocal motion and the composite motion of said second field magnet is arranged between said second field magnet and said shaft.

7. A rotary electric machine according to any one of claim 1 to claim 3, wherein said first field magnet is fixed to a shaft, said second field magnet is separated from said shaft, and a sleeve is inserted between the inside of said second filed magnet and said shaft to fix said second field magnet to said sleeve.

8. A rotary electric machine according to claim 8, wherein

said sleeve is made of a non-magnetic material having an electric resistivity higher than that of iron.

9. An electric motor according to any one of claim 1 to claim 3, wherein said first field magnet is fixed to a shaft, said second field magnet is separated from said shaft, a plurality of springs is arranged before and after said second field magnet to guide the rotational motion and the reciprocal motion and the composite motion of said second field magnet.

10. An electric motor according to any one of claim 1 to claim 3, wherein said first field magnet is fixed to a shaft, said second field magnet is separated from said shaft, a depressing portion is formed on a side surface of said first field magnet where said first field magnet and said second field magnet are in contact with each other, a projecting portion also serving as a function of said sleeve is formed in said second field magnet.

11. An electric motor according to any one of claim 1 to claim 3, wherein said first field magnet is fixed to a shaft, said second field magnet is separated from said shaft, and a stopper is arranged at a position apart from a side surface of said second field magnet, said stopper having a supporting mechanism for guiding rotational motion and reciprocal motion and the composite

motion to said second field magnet and said shaft.

12. An electric motor according to any one of claim 1 to claim 3, wherein said first field magnet is fixed to a shaft, said second field magnet is separated from said shaft, an air gap between said rotor having said second field magnet and said stator is larger than an air gap between the rotor having said first field magnet and said stator.

13. An electric motor according to any one of claim 1 to claim 3, wherein said first and said second field magnets are opposite to the magnetic poles of said stator, and said first and said second field magnets are relatively movable in the axial direction.

14. A washing machine according to any one of claim 1 to claim 3, wherein said electric motor is operated by making positions of the magnetic pole centers of said first field magnet and said second field magnet in phase during low speed operation, and by making the positions of the magnetic pole centers of said first field magnet and said second field magnet out of phase during high speed and low load operation.

15. A washing machine according to any one of claim 1 to claim

3, wherein said electric motor is operated by making positions of the magnetic pole centers of said first field magnet and said second field magnet in phase during said washing or rinsing operation, and by making the positions of the magnetic pole centers of said first field magnet and said second field magnet out of phase during spin-drying operation.